ANNUAL REPORT FOR 2015

Tommy's Road Wetland Mitigation Site
Wayne County
TIP No. R-2554BA
COE Action ID: SAW 2008-00252
NCDWR: 20080570

Prepared By:
Natural Environment Section & Roadside Environmental Unit
North Carolina Department of Transportation
January 2016

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SUMMARY

The following report summarizes the wetland monitoring activities conducted during 2015 at the Tommy's Road mitigation site. This site, situated adjacent to the new NC 44/Future US 70 Goldsboro Bypass near Goldsboro, was designed and constructed during 2011 by the North Carolina Department of Transportation (NCDOT) in order to provide mitigation for wetland impacts associated with the construction of Transportation Improvement Program (TIP) number R-2554BA. This report provides the monitoring results for the fourth formal year of monitoring (Year 2015). The site must demonstrate hydrologic and vegetative monitoring success for a minimum of five years or until the site is deemed successful.

The site hydrology is monitored with two groundwater gauges including one gauge in the restoration area and one reference gauge in the wetland preservation area. Both of the groundwater gauges met the jurisdictional criteria for wetland hydrology (>12.5% of the growing season) in 2015.

Two vegetation plots were established to monitor the vegetation planted in the 0.11 acre restoration site. The 2015 vegetation monitoring revealed an average density of 524 trees per acre, which is above the minimum success criteria of 288 trees per acre for year four.

NCDOT will continue hydrologic and vegetation monitoring at the Tommy's Road mitigation site in 2016.

1.0 INTRODUCTION

1.1 Project Description

The following report summarizes the wetland monitoring activities that have occurred during 2015 at the Tommy's Road mitigation site. The site is located adjacent to the new NC 44/Future US 70 Goldsboro Bypass near Goldsboro (Figure 1). The site was constructed to provide mitigation for wetland impacts associated with R-2554BA in Wayne County. The 3.91 acre site provides 2.37 acres of wetland preservation, 0.11 acre wetland restoration, 61 linear feet of stream restoration and 691 linear feet of stream preservation. The site also provides 7,792 ft^2 of Neuse buffer restoration (4,459 ft^2 in Zone 1 and 3,333 ft^2 in Zone 2).

1.2 Purpose

In order to demonstrate successful mitigation, hydrologic and vegetative monitoring must be conducted for a minimum of five years or until success criteria are satisfied. Success criteria are based on federal guidelines for wetland mitigation. Criteria for hydrologic conditions and vegetation survival are included in these documents. The following report details the results of hydrologic and vegetation monitoring during the 2015 growing season at the Tommy's Road mitigation site.

1.3 Project History

September 2011	Site Constructed
January 2012	Gauges Installed
February 2012	Site Planted
March-November 2012	Hydrologic Monitoring (Year 1)
August 2012	Vegetation Monitoring (Year 1)
January 2013	Supplemental Planting
March-November 2013	Hydrologic Monitoring (Year 2)
July 2013	Vegetation Monitoring (Year 2)
March-November 2014	Hydrologic Monitoring (Year 3)
July 2014	Vegetation Monitoring (Year 3)
March-November 2015	Hydrologic Monitoring (Year 4)
July 2015	Vegetation Monitoring (Year 4)

1.4 Debit Ledger

The entire Tommy's Road mitigation site was used for the R-2554BA project to compensate for unavoidable wetland and stream impacts.

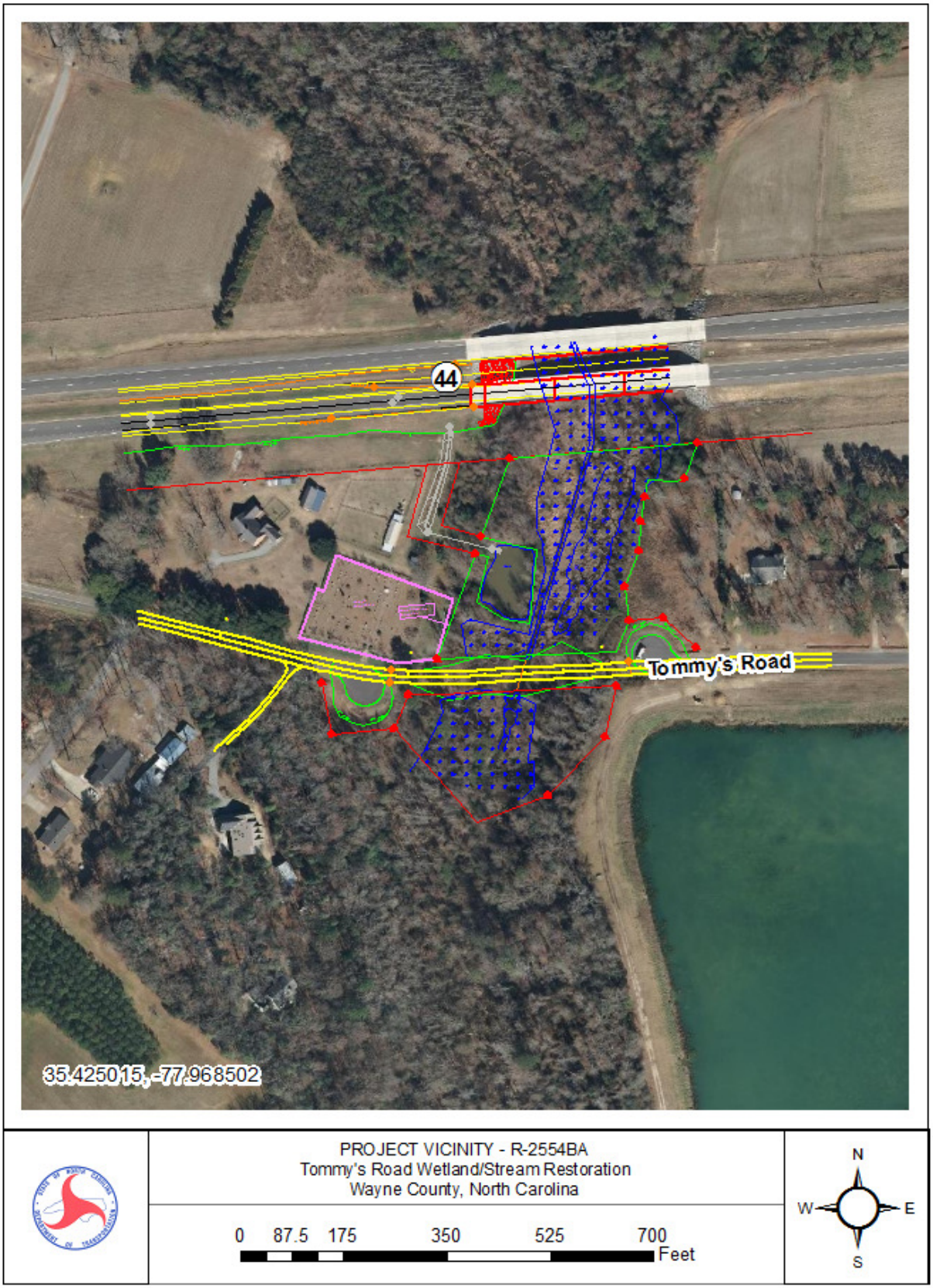

Figure 1. Site Location Map

2.0 HYDROLOGY

2.1 Success Criteria

In accordance with the mitigation plan and permit for wetland mitigation, the success criteria for hydrology states that the area must be inundated or saturated (within 12" of the surface) by surface or ground water for at least a consecutive 12.5% of the growing season. The hydrologic monitoring shall persist for a total of five years with monitoring reports submitted annually.

The growing season in Wayne County begins March 17 and ends November 14. These dates correspond to a 50% probability that temperatures will remain above 28^{o} F or higher after March 17 and before November 14. The growing season is 243 days; therefore hydrology for 12.5% of the growing season is at least 30 consecutive days. Local climate must represent average conditions for the area in order for the hydrologic data to be valid.

2.2 Hydrologic Description

Two groundwater monitoring gauges are used to record site hydrologic data including one in the restoration area and one reference gauge in the preservation area. The groundwater gauges are set to record daily water levels. The hydrologic response (groundwater) to rainfall events is evaluated using data provided by the North Carolina State Climate Office.

Appendix A contains a plot of the water depth for each of the groundwater monitoring gauges for 2015. Precipitation events, provided by the State Climate Office, are included on each groundwater graph as bars.

2.3 Results of Hydrologic Monitoring

2.3.1 Site Data

The total number of consecutive days that the groundwater was within twelve inches of the surface was determined for each groundwater monitoring gauge. This number was converted into a percentage of the growing season. Table 1 presents the hydrologic results for 2015. Table 2 presents the hydrologic results at the site since construction was completed. Figure 3 is a graphical representation of the hydrologic monitoring results for 2015.

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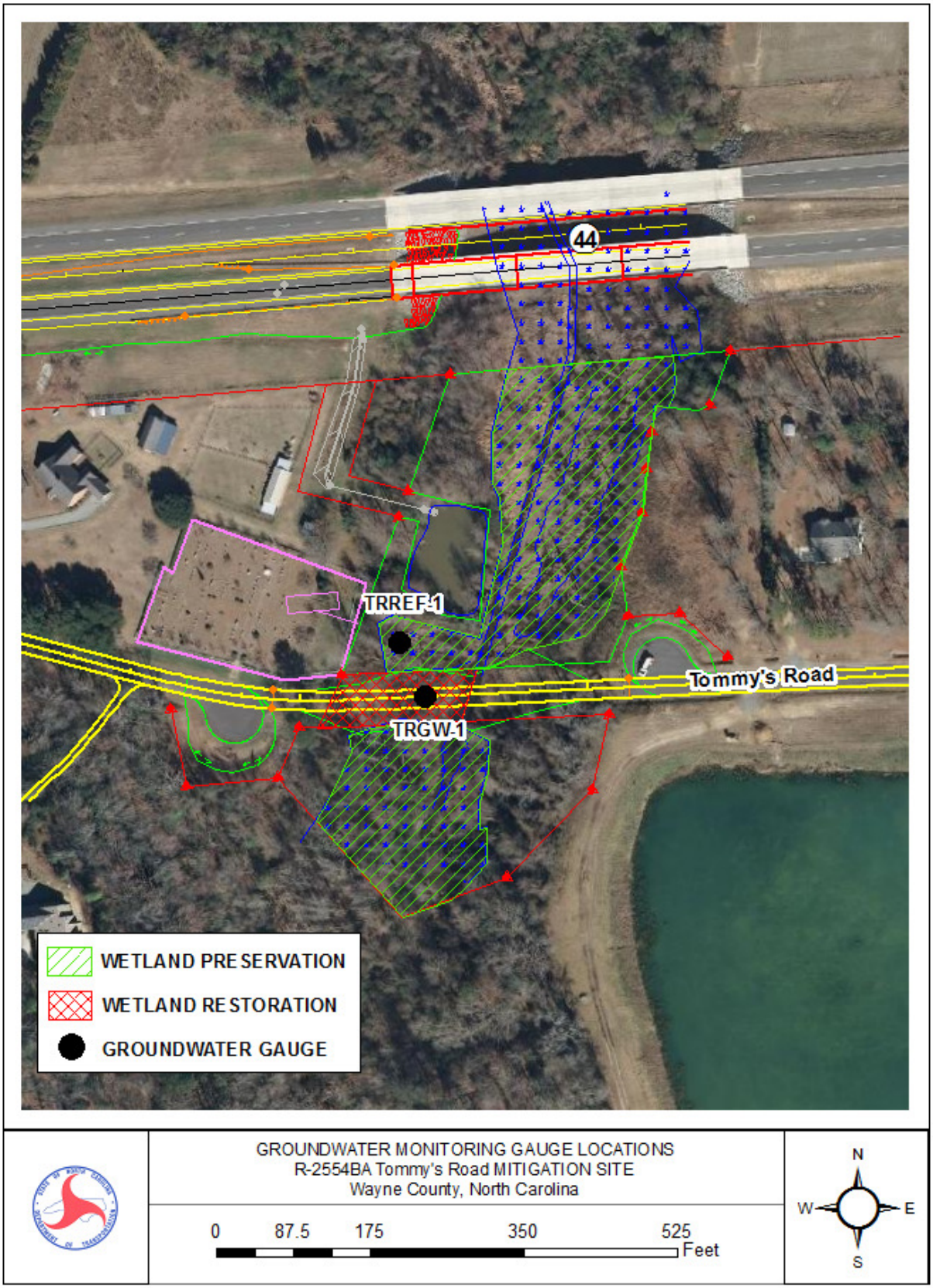


Figure 2. Monitoring Gauge Location Map

Table 1. 2015 Hydrologic Monitoring Results

Monitoring Gauge	< 5%	5 – 12.5%	> 12.5%	Actual %	Dates of Success
TRGW-1			**X**	26.7	Mar 17-May 20; June 30-July 29; Sept 26-Nov 14
*TRREF-1			**X**	100.0	Mar 17-Nov 15

*TRREF-1 is located in the preservation area.
*Appendix A contains plots of groundwater data during 2015.

Table 2. 2012-2016 Hydrologic Monitoring Results

Monitoring Gauge	2012 Results	2013 Results	2014 Results	2015 Results	2016 Results
TRGW-1	51.4	23.0	47.3	26.7	
TRREF-2	100.0	100.0	100.0	100.00	
Climate Conditions	Ave./Above Average Rainfall	Ave./Above Average Rainfall	Above Average Rainfall	Ave./Above Average Rainfall	

2.3.2 Climatic Data

Figure 4 is a comparison of monthly rainfall for the period of January 2015 through November 2015 to historical precipitation (collected between 1985 and 2014) for Cherry Research Station in Wayne County. This comparison gives an indication of how 2015 relates to historical data in terms of climate conditions. The NC State Climate Office provided all local rainfall information.

For the 2015-year, March, May, June, July, and September experienced average rainfall. August recorded slightly below average rainfall while January, February, April, October, and November recorded above average rainfall. Overall 2015 experienced an average to above average rainfall year.

2.4 Conclusions

The 2015 year represents the fourth year that hydrologic data has been collected on the Tommy's Road mitigation site. Both of the groundwater monitoring gauges met the jurisdictional criteria for wetland hydrology (>12.5% of the growing season) in the 2015 monitoring year.

NCDOT will continue to monitor the hydrology at the Tommy's Road mitigation site in 2016.

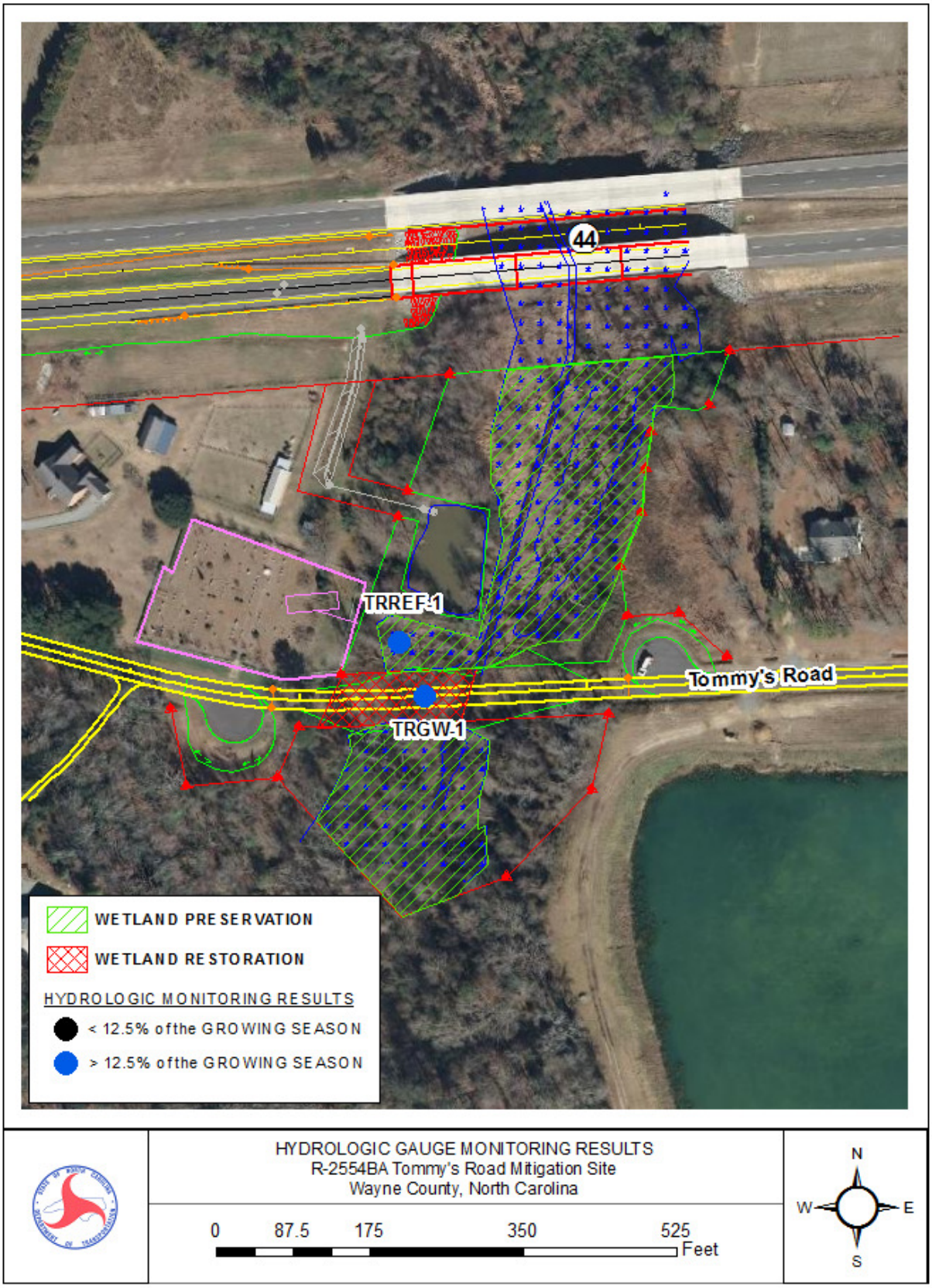


Figure 3. 2015 Hydrologic Monitoring Results

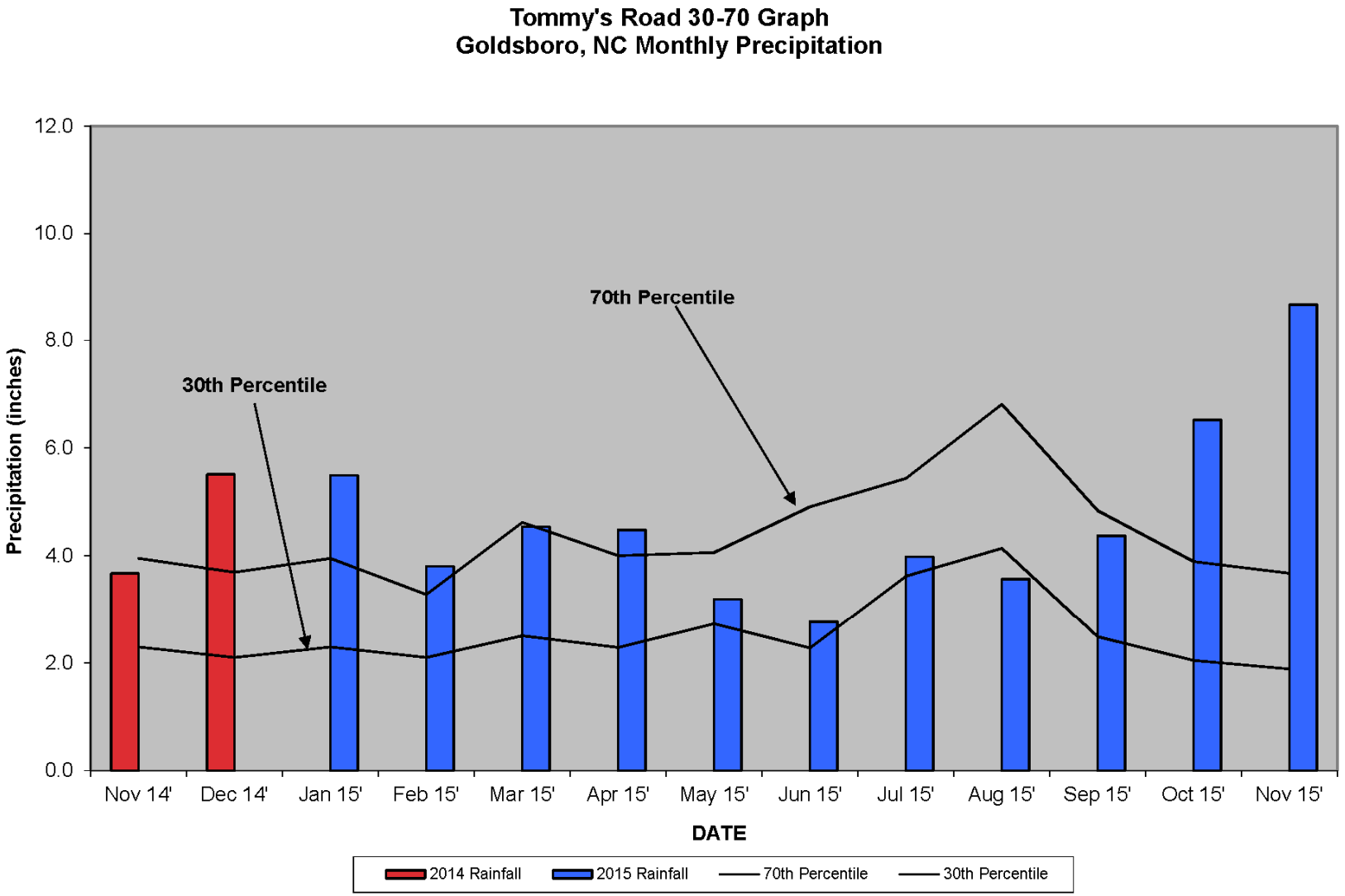


Figure 4. 30-70 Percentile Graph 2015

3.0 VEGETATION: TOMMY'S ROAD MITIGATION SITE (YEAR 4 MONITORING)

3.1 Success Criteria

For the onsite wetland mitigation sites, the permittee shall plant 680 stems/acre. Vegetation success shall be measured by survivability over a 5 year monitoring period. Survivability will be based on 320 stems/acre after three (3) years and 260 stems after five (5) years. A survey of vegetation during the growing season shall be conducted annually over the five-year monitoring period and submitted to the NC division of Water Quality. If the surviving vegetation densities are below the required thresholds after the five-year monitoring period, the site may still be declared successful at the discretion of and with written approval from the NC Division of Water Quality.

For the onsite buffer mitigation sites, the permittee shall monitor the sites. An annual report shall be submitted to DWQ for a period of 5 years showing monitoring results survival rate/ success of tree and vegetation establishment, and that diffuse flow through the riparian buffer has been maintained. The first annual report shall be submitted within one year of final planting. Failure to achieve a buffer density of 320 trees per acre after 5 years will require the annual report to provide appropriate remedial actions to be implemented and a schedule for implementation. Approval of the final annual report, and a formal "close out" of the mitigation site by the DWQ is required.

3.2 Description of Species

The following live stakes were planted along Streambank:

Salix nigra, Black Willow

Cornus amomum, Silky Dogwood

The following tree species were planted in the Wetland Restoration and Buffer Areas:

Platanus occidentalis, American Sycamore

Fraxinus pennsylvanica, Green Ash

Betula nigra, River Birch

Liriodendron tulipifera, Tulip Poplar

3.3 Results of Vegetation Monitoring

Table 3. Vegetation Monitoring Statistics

Plot #	Sycamore	Green Ash	River Birch	Tulip Poplar	Total (Year 4)	Total (at planting)	Density (Trees/Acre)
1	13	8	8	5	34	53	436
2	26	24		4	54	60	612
Year 4 Average Density (Trees/Acre)							524
Year 3 Average Density							534
Year 2 Average Density							642
Year 1 Average Density							327

Site Notes: A supplemental planting took place at this site on January 17, 2013 due to low plant survival in 2012. Other species noted onsite included: *Juncus* sp., woolgrass, cattail, baccharis, pine, smartweed, red maple, sweetgum, black willow, *Scirpus* sp., willow oak, and various grasses. The stream restoration is stable at this time and silky dogwood were noted surviving along the streambank. There are visible signs of beaver activity in Vegetation Plot #2. Some of the trees damaged by the beavers had already started to re-sprout new leaves. USDA will be contacted to trap the beaver's onsite.

3.4 Conclusions

There were two vegetation monitoring plots established throughout the wetland restoration and buffer areas. The 2015 vegetation monitoring of the site revealed an average tree density of 524 trees per acre. This average is well above the minimum success criteria of 288 trees per acre for the fourth year of monitoring.

NCDOT proposes to continue monitoring vegetation at the Tommy's Road Mitigation Site for 2016.

4.0 OVERALL CONCLUSIONS/ RECOMMENDATIONS

The 2015 year represents the fourth year that hydrologic data has been collected on the Tommy's Road mitigation site. Both of the groundwater monitoring gauges met the jurisdictional criteria for wetland hydrology (>12.5% of the growing season) during the 2015 growing season.

There were two vegetation monitoring plots established throughout the wetland restoration area. The 2015 vegetation monitoring revealed an average density of 524 trees per acre, which is well above the minimum success criteria of 288 trees per acre.

NCDOT will continue hydrologic and vegetation monitoring at the Tommy's Road mitigation site in 2016.

APPENDIX A

GROUNDWATER GAUGE DATA

APPENDIX B

SITE PHOTOS, PHOTO LOCATIONS, AS-BUILT PLAN SHEETS

AND PLOT LOCATIONS MAP

Tommy’s Road

Photo Point #1 Looking at Vegetation Plot 1

Photo Point #2 Looking Upstream

Photo Point #2 Looking Downstream

Photo Point #3 Looking at Vegetation Plot 2

June 2015

Tommy's Road As-built
Stream Restoration and Preservation

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2554BA	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CONST. REV.

R/W REV.

N 85°15'20.00"E

SPECIAL MEDIAN CUT-/- DITCH SEE DETAIL B

TYPE M350

GRAU 350

SPECIAL CUT DITCH SEE DETAIL A

B-77

-L- +15.800 17.50m (57.41 ft.) END WW FENCE

2.5 TONS CL B RIPRAP W/11.7 SM FIL FAB

SHOULDER BERM GUTTER -L- STA. 113+99 TO 114+12.

-L- +30.000 45m (147.64 ft.)

-L- +04.800 45m (147.64 ft.)

LP

-L- +12.129 84.34m (276.63 ft.)

-L- +26.800 95m (129.99 ft.)

-L- +48.000 93m (305.11 ft.)

-L- +87.000 45m (147.64 ft.)

-L- +74.000 81m (265.75 ft.)

-L- +86.135 92.84m (304.60 ft.)

-L- +15.000 95m (311.68 ft.)

-L- +07.080 118m (387.13 ft.)

-L- +33.000 131m (429.78 ft.)

-L- +32.465 45m (147.64 ft.)

-L- +27.645 45m (147.64 ft.)

-L- +18.000 62.98m (206.63 ft.)

-L- +17.958 PROPERTY LINE

-L-

Pis Sta 116+87

Θs = 0°45'50"

Ls = 80.000

LT = 53.334

ST = 26.667

Pi Sta 19+56.116

Δ = 2°37'37.4" (RT)

L = 100.872

T = 50.445

R = 2,200.000

-SR5- PT Sta.20+05.544

S 75°20'33.8"E

BEAMS CEMETERY

CEMETERY

CONSERVATION EASEMENT

-SR5- +5.000 9.144m (29.99 ft.)

-SR5- PC Sta.20+55.017

-SR5- PT Sta.21+45.247

-SR5- +01.000 128m (419.94 ft.)

-SR5- +52.008 9.144

BEGIN CONSTRUCTION -SR5- PC Sta.20+60.000

-SR5- +67.000 34m (111.55 ft.)

10m R

GRADE TO DRAIN

PROP. 3.6m GATE

-SR5-

S 81°24'09.9"E

-SR5- +49.008 9.144m (29.99 ft.)

-SR5- PC Sta.22+77.138

END CONSTRUCTION -SR5- POT Sta.22+45.000

-SR5- +07.000 9.144m (29.99 ft.)

RETAIN 375mm CONC

SR 1521 TOMMY'S RD

Stream Restoration
61 LF

Stream Preservation
691 LF

Tommy's Road As-built
Wetland Restoration and Preservation

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2554B.A	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST. REV.	
R/W REV.	

Pl Sta 19+55.116
Δ = 2°37'37.9" (RT)
L = 100.872
T = 50.445
R = 2,200.000

-SR5- PT Sta. 20+05.566

S 75°20'33.6" E

-SR5- PC Sta. 20+55.017

-SR5- PT Sta. 21+15.247

BEGIN CONSTRUCTION
-SR5- POC Sta. 20+60.000

-SR5- PC Sta. 22+77.138

S 81°24'09.9" E

END CONSTRUCTION
-SR5- POT Sta. 22+45.000

Pls Sta 116+87
Θs = 0°45'50"
Ls = 80.000
LT = 53.334
ST = 26.667

Wetland Restoration
0.11 Ac.

Wetland Preservation
2.37 Ac.

Tommy's Road As-built
Reforestation Area

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-25548A	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST. REV.	
R/W REV.	

N 85°15'20"W

SPECIAL MEDIAN CUT DITCH SEE DETAIL B

TYPE M356

GRAU 356

SPECIAL CUT DITCH SEE DETAIL A

3GI

B-77

FS

-L- +15.807
17.50m (57.41 ft)
END WW FENCE

2.5 TONS CL B RIPRAP
W11.7 SM FIL FAB

SHOULDER BRM GUTTER
-L- STA. 113+97 TO 114+12.32

-L- +30.000
45m (147.64 ft)

-L- +07.800
45m (147.64 ft)

-L- +45.080
45m (147.64 ft)

LP

-L- +32.465
45m (147.64 ft)

-L- +21.645
45m (147.64 ft)

-L- +10.826
6.234m (20.453 ft)

-L- +17.958
PROPERTY LINE

Pis Sta 116+97
Θs = 0°45'5
Ls = 60.000
LT = 53.334
ST = 26.667

-L- +74.000
81m (265.75 ft)

-L- +12.129
84.144m (275.93 ft)

-L- +26.000
85m (278.99 ft)

-L- +40.880
9.3m (30.51 ft)

-L- +88.135
92.843m (304.80 ft)

-L- +15.000
95m (311.68 ft)

-L- +07.800
118m (387.13 ft)

-L- +33.000
134m (439.78 ft)

-L- +20.000
128m (419.94 ft)

Pi Sta 19+55.116
Δ = 2°37'31.4" (RT)
L = 100.872
T = 50.445
R = 2,200.000

-SR5- PT Sta.20+05.544

S 75°20'33.5" E

DEANS CEMETERY

CONSERVATION EASEMENT

-SR5- PC Sta.20+55.017

-SR5- PT Sta.21+45.247

-SR5- +15.000
9.144m (29.99 ft)

-SR5- +57.090
9.144

BEGIN CONSTRUCTION
-SR5- PCC Sta.20+60.000

-SR5- +67.000
34m (111.55 ft)

GRADE TO BRAIN

-SR5- +49.980
9.144m (29.99 ft)

-SR5- PC Sta.22+77.138

S 81°24'09.5" E

PROP. 3.6m GATE

END CONSTRUCTION
-SR5- POT Sta.22+45.000

-SR5- +07.008
9.144m (29.99 ft)

RETAIN

Reforestation

Tommy's Road As-built - Guage, Photo Point and Vegetation Plot Locations

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2554SA	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST. REV.	
R/W REV.	

N 85°15'20" E

SPECIAL MEDIAN CUT-Ø- DITCH SEE DETAIL B

TYPE M35B

GRAU 35B

SPECIAL CUT DITCH SEE DETAIL A

-L- +15.802 17.50m (57.41 ft.) END MW FENCE

E5 TONS CL B RIPRAP W/11.7 SM FIL FAB

SHOULDER BERM GUTTER -L- STA. 113+99.97 TO 114+12.32

-L- +30.000 45m (147.64 ft.)

-L- +87.000 45m (147.64 ft.)

-L- +104.000 45m (147.64 RT.)

LP

-L- +74.000 81m (265.75 ft.)

-L- +108.135 92.43m (304.50 ft.)

-L- +12.129 84.44m (277.03 ft.)

-L- +26.880 89m (291.99 ft.)

-L- +48.000 93m (305.11 ft.)

-L- +15.000 95m (311.68 ft.)

-L- +107.000 118m (387.13 ft.)

-L- +33.800 13m (42.78 ft.)

-L- +32.465 45m (147.64 ft.)

-L- +27.845 45m (147.64 ft.)

-L- +17.958 PROPERTY LINE

Pls Sta 116+87
Θs = 0°45'50"
Ls = 80.000
LT = 53.334
ST = 26.667

PI Sta 19+55.116
Δ = 2°37'37.4" (RT)
D = 100.872
R = 90.445
T = 2.200.000

-SR5- PT Sta.20+05.544

S 75°20'33.5" E

DEANS CEMETERY

CEMETARY

CONSERVATION EASEMENT

-SR5- +15.000 9.144m (29.99 ft.)

-SR5- PC Sta.20+55.011

-SR5- PT Sta.21+45.247

-L- +201.800 128m (419.94 ft.)

-SR5- +57.000 9.144m (29.99 ft.)

BEGIN CONSTRUCTION -SR5- BOC Sta.20+60.000

-SR5- +67.000 34m (111.55 ft.)

GRADE TO BRAIN

PLOT #1

PLOT #2

-SR5- GW1EB02CE2

PROP. 3.4m GATE

S 81°24'09" E

ST 1571 TIMMY'S RD 6.4 BST

END CONSTRUCTION -SR5- POT Sta.22+45.000

-SR5- +07.000 9.144m (29.99 ft.)

-SR5- +49.000 9.144m (29.99 ft.)

-SR5- PC Sta.22+77.138

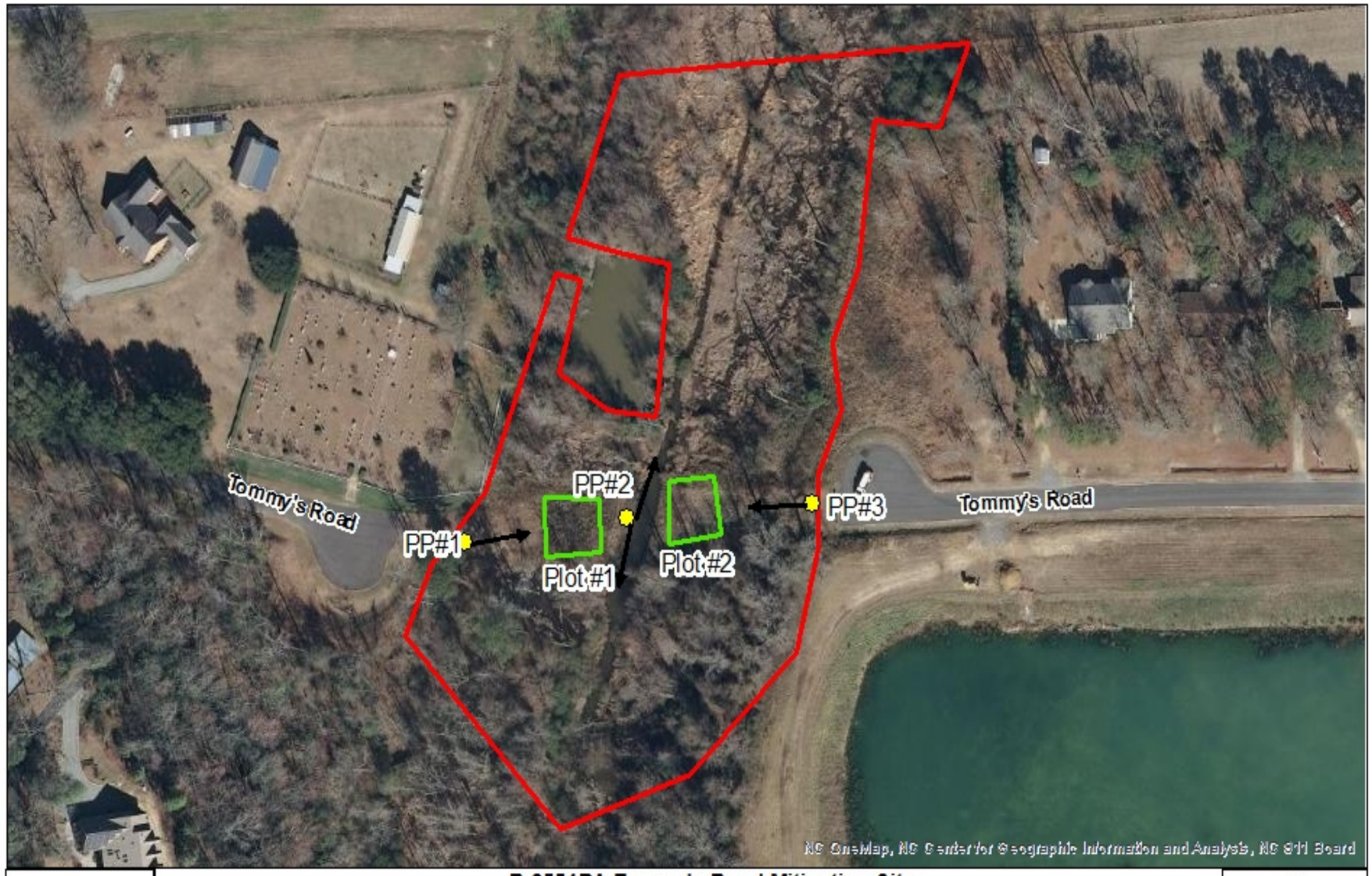
RETAIN 375mm CMNC

GRADE TO BRAIN

+ PP1 Photo Points

⊕ GW Gauge Locations

Plot Vegetation Plot



R-2554BA Tommy's Road Mitigation Site
Photo Point and Vegetation Plot Locations
Wayne County, North Carolina

0 155 310 620 Feet

N
W E
S